

REMARKS

In the final Office Action, the Examiner rejects claims 1, 11, 13, 21, 22, 24, 26, 27, 30, and 31 under 35 U.S.C. § 112, second paragraph, as being indefinite; rejects claims 21-29 under 35 U.S.C. § 101 as being directed to non-statutory subject matter; rejects claims 1-30 under 35 U.S.C. § 103(a) as being unpatentable over CHANG et al. ("Predicate Rewriting for Translating Boolean Queries in a Heterogeneous Information System, ACM Transactions on Information Systems, Vol. 17, No. 1, January 1999) in view of MCGREEVY (U.S. Patent Application Publication No. 2003/0004914); rejects claim 31 under 35 U.S.C. § 103(a) as being unpatentable over WAN (U.S. Patent Application Publication No. 2003/0233618) in view of MCGREEVY and further in view of CHANG et al. The rejections are respectfully traversed.¹ The Examiner also objects to the specification for minor informalities.

Initially, in accordance with Applicants' duty to provide information regarding the substance of an interview, an in-person interview was held between Applicants' representative and Examiner Lu on May 7, 2007. Applicants would like to thank Examiner Lu for the courtesies extended during the interview. During the interview, the rejection based on CHANG et al. and MCGREEVY was discussed. No agreement was reached.

¹ As Applicants' remarks with respect to the Examiner's rejections overcome the rejections, Applicants' silence as to certain assertions by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art, motivation to combine references, assertions as to dependent claims, etc.) is not a concession by Applicants that such assertions are accurate or that such requirements have been met, and Applicants reserve the right to dispute these assertions/requirements in the future.

By this Amendment, Applicants propose amending the specification and claims 1, 11, 13, 21, 22, 24, 26, and 27-31 to improve form. No new matter has been added. Claims 1-31 remain pending.

Objection to the Specification

The specification stands objected to for minor informalities. Particularly, the Examiner indicates that paragraphs 8, 42, 45, and 52 contain typographical errors (final Office Action, p. 2). Applicants propose amending paragraphs 8, 42, 45, and 52 to correct the errors.

Withdrawal of the objection to the specification is respectfully requested.

Rejection under 35 U.S.C. § 112, second paragraph

Claims 1, 11, 13, 21, 22, 24, 26, 27, 30, and 31 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Particularly, the Examiner asserts that specific terms recited in claims 1, 11, 13, 21, 22, 24, 26, 27, 30, and 31 render the claims indefinite (final Office Action, p. 3). While not concurring with the Examiner's assertion, but solely to expedite prosecution, Applicants propose amending claims 1, 11, 13, 21, 22, 24, 26, 27, 30, and 31 to no longer recite the specified terms.

Reconsideration and withdrawal of the rejection of claims 1, 11, 13, 21, 22, 24, 26, 27, 30, and 31 under 35 U.S.C. § 112, second paragraph are respectfully requested.

Rejection under 35 U.S.C. § 101

Claims 21-29 stand rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter. Applicants respectfully traverse the rejection.

With respect to independent claim 21, the Examiner particularly asserts that claim 21 (and claims 22-26, by virtue of their dependency) is directed to a system that includes various components of a stopword detection component that is defined by software instructions and, as such, do not fall into any one of the statutory categories set forth in 35 U.S.C. § 101 (final Office Action, p. 6, citing paragraph 31 of Applicants' specification for support). With respect to independent claim 27, the Examiner particularly asserts that claim 27 (and claims 28 and 29, by virtue of their dependency), in view of paragraph 31 of Applicants' specification, is directed to a device that includes various means for performing functions that are performed by components defined by software instructions—not by any hardware means—and, as such, the device does not fall into any one of the statutory categories set forth in 35 U.S.C. § 101 (final Office Action, p. 6). Without concurring with the Examiners assertions, but solely to expedite prosecution, Applicants propose amending claims 21 and 27 to recite a “system implemented within one or more computer devices,” which constitutes statutory subject matter under 35 U.S.C. § 101.

Reconsideration and withdrawal of the rejection of claims 21-29 under 35 U.S.C. § 101 are respectfully requested.

Rejection under 35 U.S.C. § 103(a) Based on CHANG et al. and MCGREEVY

Claims 1-30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over CHANG et al. in view of MCGREEVY. The rejection is respectfully traversed.

Amended claim 1 is directed to a method of detecting stopwords in a query. The method includes identifying a potential stopword in the query based on a comparison to a list of stopwords; generating a plurality of sets of context data based on the query and the potential stopword; comparing the sets of context data; and classifying the potential stopword either as an actual stopword or a non-stopword based on the comparing. This combination of features is not disclosed or suggested by CHANG et al. and MCGREEVY, whether taken alone, or in any reasonable combination.

For example, CHANG et al. and MCGREEVY, whether taken alone, or in any reasonable combination, do not disclose or suggest classifying a potential stopword either as an actual stopword or a non-stopword based on a comparing of generated sets of context data, as required by claim 1, as amended. The Examiner cites Figs. 12 and 13, and paragraphs 194-198 of MCGREEVY and page 32 of CHANG et al. as allegedly relevant to features previously recited in claim 1 (final Office Action, pp. 8-9). Applicants respectfully submit that these sections of MCGREEVY and CHANG et al. fail to disclose or suggest the above feature of amended claim 1.

Fig. 12 of MCGREEVY depicts a process 1200 in which the query includes a number of query fields. A relational model of the contents of each one of the query fields is created in block 1202, and in block 1204, the models of query fields are combined (paragraph 194). Fig. 13 of MCGREEVY depicts a method 1204 of combining the query

field models. With respect to Fig. 13, MCGREEVY, at paragraph 194, discloses successively processing "relations" of all the query field models using term pair selection and comparison, and outputting the resulting query model. Nowhere in connection with Figs. 12 and 13, paragraph 194, or elsewhere, does MCGREEVY disclose or suggest classifying a potential stopword either as an actual stopword or a non-stopword based on a comparing of generated sets of context data, as required by claim 1, as amended.

In paragraphs 195-197, MCGREEVY discloses:

Inputting the query can also include assigning a weight to at least one of the query fields. Each one of the RSMs corresponding to the selected query field is scaled by a factor determined by the assigned weight. This allows each query field to be given an importance value relative to the other query fields.

Stopterms play an important role in phrase search because some queries will contain one or more stopterms. Stopterms can include any terms, but in one alternative, stopterms include words such as "a", "an", "the", "of", "to", and "on". In phrase search, the user can add terms to, or remove terms from, the list of stopterms.

In one alternative of phrase search, a search finds subsets that contain a particular phrase that includes particular stopterms, such as "on approach to the runway". In another alternative of phrase search, stopterms are ignored and a search finds subsets containing phrases whose non-stopterms match the query phrase or phrases. For example, in the query "We were on approach to the runway at LAX" the words "we", "were", "on", "to", "the", and "at" could, if the user so indicated, be considered to be stopterms, and the query would match subsets containing sequences such as "He was on approach to runway 25L, a mile from LAX". In another embodiment, a query "on approach to the runway" matches all occurrences in subsets of "on approach to the runway" as well as similar phrases in subsets such as "on approach to runway 25R". Preferably the exact matches are listed first in the output.

These sections of MCGREEVY disclose that in phrase search, some queries contain a stopterm(s) and the user can add terms to or remove terms from the list of stopterms. In a phrase search, a search finds subsets that contain a particular phrase that includes

particular stopterms, or alternatively, stopterms are ignored and a search finds subsets containing phrases whose non-stopterms match the query phrase or phrases. Nowhere in these sections, or elsewhere, does MCGREEVY disclose or suggest classifying a potential stopword either as an actual stopword or a non-stopword based on a comparing of generated sets of context data, as required by claim 1, as amended.

In paragraph 198, MCGREEVY discloses:

In phrase search, a query model can be modified as a function of the stopterms in the query. Recall that each query model contains relations, and each relation contains a term pair and associated relational summation metrics (RSMs). When a query model is created based on a query such as "on approach to the runway", that query model can include query model term pairs such as "on, approach", "on, to", "approach, runway", as well as others. One alternative is to eliminate all relations containing stopterms. As another alternative, stopterms can be retained and treated just like any other term. In yet another alternative, relations containing one or more stopterms can be differentiated from others. For example, in order to adjust the weight of each relation to favor topical term pairs such as "approach, runway" over terms [sic] pairs containing one stopterm such as "the, runway", and term pairs containing two stopterms such as "on, to", it is possible to modify the metrics of each relation as a function of the stopterms contained in the term pairs.

This section of MCGREEVY discloses a phrase search methodology in which a query model can be modified as a function of the stopterms in the query by: 1) eliminating all relations containing stopterms; 2) treating the stopterms as any other term; or 3) modifying the metrics of each relation as a function of the stopterms contained in the term pairs, i.e., weighting term pairs differently based on the stopterm(s). Nowhere in this section, or elsewhere, does MCGREEVY disclose or suggest classifying a potential stopword either as an actual stopword or a non-stopword based on a comparing of generated sets of context data, as required by claim 1, as amended.

In fact, MCGREEVY in no way relates to a method of detecting stopwords in a query, much less discloses or suggests classifying a potential stopword either as an actual stopword or a non-stopword based on a comparing of generated sets of context data, as required by claim 1, as amended. In contrast, MCGREEVY appears to disclose that if a particular term is included in a list of stopterms/stop relations, it is a stopterm, otherwise it is not. MCGREEVY further discloses that the user can add terms to or remove term from the list of stopterms (para. 196).

CHANG et al., at page 32, along with Fig. 11 (page 32), disclose:

6.2 Summary of Other Experiments

The stopword experiments evaluated the rewriting rule for stopword removal (Section 5.2.1). We compared the result size of a sample query Q (e.g., `Contains(Text, video (W) on (W) demand)`) containing stopwords (e.g., `on`) to that of its subsuming query Q^S (e.g., `Contains(Text, video (1W) demand)`), with stopwords removed (by the procedure in Figure 4). The sample queries are of the parametric form $Q = \text{Contains}(\text{Text}, w_1 \text{ op } w_2 \text{ op } \dots \text{ op } w_n)$. We set up two configurations, which differ only in the connecting operator `op`: configuration `Config-Prox` uses `W`, while `Config-Conj` uses `AND`. To generate the queries, we selected from VOC_{foldoc} all the phrases containing at least one stopword specified by the information service *Britannica Online*.⁹

Figure 11 illustrates the distribution of the pairs $[Size(\langle Q \rangle), Size(\langle Q^S \rangle)]$. The results depend not only on the connecting operators (i.e., `AND` or `W`), but also on the *remaining lengths* of the subsuming queries, i.e., the numbers of search words remaining in the subsuming queries after the removal of stopwords.

In all the cases except when the remaining length is 1 in configuration `Config-Prox`, the subsuming queries closely approximate the sample queries. In summary, first, unless a query contains mostly stopwords, the subsuming query with stopwords removed closely approximates the original query. Second, notice that stopword removal from conjunctive expressions does not reduce selectivity as much as was the case with proximity

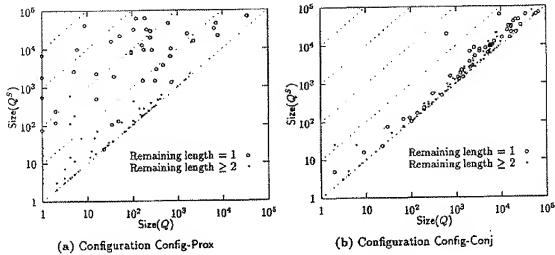


Fig. 11. Results of the stopword experiments.

This portion of CHANG et al. discloses a stopword experiment in which a rewriting rule for stopword removal was evaluated, in which a comparison was made of the result size of a sample query Q having stopwords and a subsuming query Q^s having had the stopwords removed. CHANG et al. discloses that in all cases, except when the numbers of words remaining in Q^s (post-removal of stopwords) was one (1), Q^s “closely approximate[s]” Q , from which the authors deduce that unless a query contains “mostly” stopwords, the original query sans stopwords “closely approximates” the original query. Nowhere in this portion, or elsewhere, does CHANG et al. disclose or suggest classifying a potential stopword either as an actual stopword or a non-stopword based on a comparing of generated sets of context data, as required by claim 1, as amended.

For at least these reasons, claim 1, as amended, is patentable over CHANG et al. and MCGREEVY, whether taken alone, or in any reasonable combination. Claims 2-10 depend from claim 1 and are, therefore, patentable over CHANG et al. and

MCGREEVY, whether taken alone, or in any reasonable combination, for at least the reasons give with respect to amended claim 1.

Independent claim 11, as amended, is directed to a method that includes identifying potential stopwords in a query; generating context data based on the query and the potential stopwords; performing a comparison of the context data; designating at least one of the potential stopwords as a non-stopword based on the comparison; designating actual stopwords from among the potential stopwords based on the comparison; and rewriting the query to remove one or more of the actual stopwords from the query. This combination of features is not disclosed or suggested by CHANG et al. and MCGREEVY, whether taken alone, or in any reasonable combination.

For example, CHANG et al. and MCGREEVY, whether taken alone, or in any reasonable combination, do not disclose or suggest designating at least one of the potential stopwords as a non-stopword based on a comparison of generated context data; and designating actual stopwords from among the potential stopwords based on the comparison, as required by claim 11, as amended. The Examiner cites paragraphs 198 and 202 of MCGREEVY and page 32 of CHANG et al. as allegedly relevant to features previously recited in claim 11 (final Office Action, p 10). Applicants respectfully submit that these sections of MCGREEVY and CHANG et al. fail to disclose or suggest the above feature of amended claim 11.

Paragraph 198 of MCGREEVY is reproduced above. This section of MCGREEVY discloses a phrase search methodology in which a query model can be modified as a function of the stopterms in the query by: 1) eliminating all relations

containing stopterms; 2) treating the stopterms as any other term; or 3) modifying the metrics of each relation as a function of the stopterms contained in the term pairs, i.e., weighting term pairs differently based on the stopterm(s). Nowhere in this section, or elsewhere, does MCGREEVY disclose or suggest designating at least one of the potential stopwords as a non-stopword based on a comparison of generated context data; and designating actual stopwords from among the potential stopwords based on the comparison, as required by claim 11, as amended.

In paragraph 202, MCGREEVY discloses:

Another alternative embodiment includes a list of stop relations. A stop relation is a relation that does not necessarily include stopterms but is treated similarly to a stopterm in that stop relations may be excluded, or given more or less relevance weighting, etc., as described above for stopterms. Each one of the stop relations includes a first term and a second term and a number of types of relational metrics. For one embodiment, any stop relations in the relational model of the query are eliminated from the query. Eliminating a stop relation blocks the collection of the related concepts described by the stop relation. For example, returning to the fatigue example described above, a stop relation might include the term pair "fatigue" and "metal". Eliminating the "fatigue, metal" stop relation from the model of the query results in removing that contextual association from consideration as a relevant feature.

This section of MCGREEVY discloses a phrase search methodology that includes a list of stop relations, where a stop relation is a relation that does not necessarily include stopterms, but is treated similarly to a stopterm in that stop relations may be excluded, or given more or less relevance weighting, etc., as with stopterms. Each one of the stop relations includes a first term and a second term and a number of types of relational metrics. Nowhere in this section, or elsewhere, does MCGREEVY disclose or suggest designating at least one of the potential stopwords as a non-stopword based on a

comparison of generated context data; and designating actual stopwords from among the potential stopwords based on the comparison, as required by claim 11, as amended.

Page 32 of CHANG et al. is reproduced above. This portion of CHANG et al. discloses a stopword experiment that evaluated a rewriting rule for stopword removal, in which a comparison was made of the result size of a sample query Q having stopwords and a subsuming query Q^s having had the stopwords removed. CHANG et al. discloses that in all cases, except when the numbers of words remaining in Q^s (post-removal of stopwords) was one (1), Q^s “closely approximate[s]” Q , from which the authors deduce that unless a query contains “mostly” stopwords, the original query sans stopwords “closely approximates” the original query. Nowhere in this portion, or elsewhere, does CHANG et al. disclose or suggest designating at least one of the potential stopwords as a non-stopword based on a comparison of generated context data; and designating actual stopwords from among the potential stopwords based on the comparison, as required by claim 11, as amended.

For at least these reasons, claim 11, as amended, is patentable over CHANG et al. and MCGREEVY, whether taken alone, or in any reasonable combination. Claims 12-20 depend from claim 11 and are, therefore, patentable over CHANG et al. and MCGREEVY, whether taken alone, or in any reasonable combination, for at least the reasons give with respect to amended claim 11.

Amended independent claims 21, 27, and 30, amended as proposed, recite features similar to, yet possibly of different scope than, claim 11 and are, therefore, patentable over CHANG et al. and MCGREEVY, whether taken alone, or in any

reasonable combination for at least reasons similar to the reasons given with respect to amended claim 11. Claims 22-26, 28, and 29 variously depend from claims 21 and 27 and are, therefore, patentable over CHANG et al. and MCGREEVY, whether taken alone, or in any reasonable combination, for at least the reasons give with respect to their respective amended base claims.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-30 under 35 U.S.C. § 103(a) based on CHANG et al. and MCGREEVY.

Rejection under 35 U.S.C. § 103(a) Based on WAN, MCGREEVY. CHANG et al.

Claim 31 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over WAN in view of MCGREEVY and further in view of CHANG et al. Applicants respectfully traverse the rejection.

Independent claim 31, amended as proposed, recites features similar to, yet possibly of different scope than, claim 11. Without acquiescing in the Examiner's rejection, Applicants respectfully submit that WAN does not cure the deficiencies in the disclosures of CHANG et al. and MCGREEVY discussed with respect to claim 11. Claim 31, as amended, is, therefore, patentable over WAN, MCGREEVY, and CHANG et al., whether taken alone, or in any reasonable combination for at least reasons similar to the reasons given with respect to claim 11.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 31 under 35 U.S.C. § 103(a) based on WAN, MCGREEVY, and CHANG et al.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully request the Examiner's reconsideration of this application, and the timely allowance of the pending claims. Applicants respectfully request entry of the present amendment because the present amendment does not raise new issues or require a further search of the art since the features were previously examined by the Examiner. Moreover, Applicants submit that the present amendment places the application in better condition for appeal should the Examiner contest the patentability of the pending claims

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,

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